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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/650,563	08/28/2003	Chandra V. Mouli	MIO 0104 VA	7597
7590 08/10/2004			EXAMINER	
DINSMORE & SHOHL LLP			OWENS, BETH E	
One Dayton Centre			ART UNIT	
Suite 500			PAPER NUMBER	
Dayton, OH 45402-2023			2824	

DATE MAILED: 08/10/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/650,563	Applicant(s) MOULI, CHANDRA V.	
	Examiner Beth E. Owens	Art Unit 2824	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-58 is/are pending in the application.
- 4a) Of the above claim(s) 31-58 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1,22-25,27,30 and 31 is/are allowed.
- 6) ☒ Claim(s) 20,21 and 26 is/are rejected.
- 7) ☒ Claim(s) 2-19,28 and 29 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>11122003</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Claim 1 is generic and allowable. Accordingly, the restriction requirement as to the encompassed species is hereby withdrawn and claims 4-6, 9-11 and 13-18, directed to the species of embodiments 2-6 are no longer withdrawn from consideration since all of the claims to this species depend from or otherwise include each of the limitations of an allowed generic claim.

In view of the above noted withdrawal of the restriction requirement as to the linked species, applicant(s) are advised that if any claim(s) depending from or including all the limitations of the allowable generic linking claim(s) be presented in a continuation or divisional application, such claims may be subject to provisional statutory and/or nonstatutory double patenting rejections over the claims of the instant application. Once a restriction requirement is withdrawn, the provisions of 35 U.S.C. 121 are no longer applicable. See *In re Ziegler*, 44 F.2d 1211, 1215, 170 USPQ 129, 131-32 (CCPA 1971). See also MPEP § 804.01.

2. Claims 32-58, drawn to the non-elected Inventions of Groups II-V, remain pending in the Application and need to be cancelled.

Specification

3. The disclosure is objected to because of the following informalities:

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Paragraph [0001], line 2: please insert --, now U.S. Patent No. 6,670,682, issued December 30, 2003-- after “2002”.

Paragraph [0038], line 6: the term “field (and/or gate) oxide 14” is misleading as in lines 3/4 the field oxide regions are designated as element 12. As Applicant in paragraph [0041], line 2, attempts to define any oxide on the substrate as being “field oxide” unless it is specifically under the gate structure 22, Examiner would like to point out that it is common in the art to consider the entire oxide film 14 as illustrated as the gate oxide film, whether it is under the gate or adjacent the gate. To avoid confusion, Examiner suggests replacing “field (and/or gate) oxide 14” with --gate oxide 14--.

Paragraph [0038], line 6: please replace “field oxide 14” with --gate oxide 14--.

Paragraph [0040], line 3: please replace “field oxide 14” with --gate oxide 14--.

Paragraph [0041], line 1: please replace “field oxide 14R, wherein field oxide 14 in the gate structure 22 is the gate oxide.” with --gate oxide 14--.

Paragraph [0044], line 3: please replace “Angstrom” with --Angstroms--.

Appropriate correction is required.

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4. The abstract of the disclosure is objected to because it is not written towards the method of manufacturing and uses the legal language “disclosed” in line 2. Correction is required. See MPEP § 608.01(b).

5. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: “Method of Manufacturing a Multilayered Doped Conductor for a Contact in an Integrated Circuit Device”.

Claim Objections

6. The following Claims are objected to because of the following informalities:

claims 2-21: please insert a comma after “The method of claim X”.

claim 7, line 1: please replace “comprises” with --comprising--.

claim 8, line 1: please replace “conductor” with --conductive--.

claim 8, line 2: please replace “conductor” with --conductive--.

claim 12, line 1: please replace “comprises” with --comprising--.

claim 12, line 2: please replace “conductor” with --conductive--.

claim 19, line 1: please replace “first dopant” with --first dopant’s--.

claim 19, line 1: please replace “second dopant” with --second dopant’s diffusivity--.

claims 20 and 21, line 1: please replace “solid state diffusion” with

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--solid-source diffusion-- as found in the Specification, paragraph [0057].

claim 28, line 1: please replace "proving" with --providing--.

claim 29, line 2: please replace "that" with --than--.

Claim Rejections - 35 USC § 112

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claim 20 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The limitation recites "forming by solid state diffusion a shallow diffusion region in said lightly doped diffusion region beneath said conductor having a dopant concentration greater than said lightly doped diffusion region." This is interpreted as the conductor having the greater concentration, not the shallow diffusion region. However, in the Specification, paragraph [0057] line 7, the Applicant discloses: "It is to be appreciated that by solid-source diffusion, the dopant concentration of the shallow diffusion region 50 is greater than the dopant concentration in LDD region 26B." This rejection may be overcome by rewriting the limitation to recite --forming by solid state diffusion a shallow diffusion region in said lightly doped diffusion region

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beneath said conductor, said shallow diffusion region having a dopant concentration greater than said lightly doped diffusion region.—

(please see claim objection above to use of “solid state diffusion”).)

Allowance

9. Claim 1, 22-25, 27, 30 and 31 are allowed.

10. The following is an examiner's statement of reasons for allowance:

There is no prior art available nor obvious motivation to combine elements of prior art which teach a method of fabricating an integrated circuit device comprising: providing an opening in an insulating layer of a partially completed device to a lightly doped diffusion region; and providing a conductor in said opening and in contact with said lightly doped diffusion region, said conductor having a first conductive layer with a first dopant and a first dopant concentration, and a second conductive layer on said first conductive layer; said second conductive layer having a second dopant at a second dopant concentration.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

11. Close prior art includes “Method for Forming Contact Plug” by Lin, in which a contact plug is formed in an opening over a source/drain region, in which 3 doped polysilicon layers of differing dopant concentrations are deposited in the opening. However, a thin layer of native oxide is left over the source/drain region. “Semiconductor Processing Method of Forming a Conductively Doped Semiconductive Material Plug within a Contact Opening” by Pan et al., discloses an opening to a node location which is filled by a first semiconductive material of a first conductivity which is then in situ doped to a higher concentration, followed by a subsequent deposition of a second layer of the same semiconductive material at a second dopant concentration, which is then also doped to approximately the same higher concentration as the first layer. “Method of Forming a Polycide Layer in a Semiconductor Device” by Jung et al. teaches depositing a doped polysilicon layer in an opening on a junction in a silicon substrate followed by a tungsten silicide layer. The doped polysilicon layer is comprised of 3 layers: an upper, intermediate, and lower doped polysilicon layer wherein the intermediate layer has a lower dopant concentration than the upper or lower layers, preventing diffusion to the junction or silicide layer during annealing.

12. Claims 2-21, 26, 28 and 29 would be allowable if rewritten to overcome all objections and the rejection(s) under 35 U.S.C. 112, second paragraph, set

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forth in this Office action and to include all of the limitations of the base claim and any intervening claims.


Conclusion

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Beth E. Owens, Ph.D. whose telephone number is 571.272.1882 and fax phone number for unofficial communications is 571.273.1882.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Elms, can be reached on 571.272.1869. The fax phone number for the organization where this application or proceeding is assigned is 703.872.9306 for official communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 571.272.2800.

BEO 08.09.04


RICHARD ELMS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800